25 APRIL 66

MEMORANDUM FOR MR. VANCE

SUBJECT: Reactions to Proposal on New General Search System

On April 23, I submitted my proposal for the new general search and surveillance satellite system to the NRP ExCom. The purpose of this memorandum is to advise you of the reactions received on the package and to discuss the issues likely to be brought up at the ExCom meeting.

The package submitted to the ExCom includes several major elements:

1. a System Operational Requirement (SOR);
2. a Request for Proposal (RFP) for the cameras;
3. A management plan;
4. rationale papers for significant portions of the preceding items; and
5. a short-range schedule of planned actions subsequent to ExCom approval.

The sections which follow discuss actual and/or anticipated reactions to the SOR, RFP, and management plan.

SYSTEM OPERATIONAL REQUIREMENT:

The SOR describes a system of 25-30 day lifetime, sufficient film to photograph in stereo approximately 20 million square miles, and from 2-4 recovery vehicles (with the latter decision to be made at the end of the spacecraft and sensor competitions). A booster of the TITAN III-D class (TITAN III core plus two three-segment, 120 inch diameter strap-on solids) will be required.

As you will recall, the early CIA plans for this system envisaged a TITAN II booster, two RV's, and a lifetime of 8-12 days on orbit. The initial SAFSP plans envisaged the use of a TITAN IIIB/AGENA booster for a system of similar characteristics.

Last Spring, the NRO became convinced that on-orbit lifetimes on the order of 25-30 days were both feasible and more cost-effective than shorter-life systems and approved the concept as a system goal (including use of the TITAN IIID booster). Subsequently, the Technical Task Group (which included NRO, CIA, and SAFSP members) agreed with that conclusion and drafted an SOR along those lines.

CIA, SAFSP, and Dr. Land's PSAC panel have indicated no disagreement with the SOR. I do not anticipate, therefore, that system configuration will be an issue at the ExCom.

REQUEST FOR PROPOSAL:

As indicated in my memo to the ExCom, one of the more difficult problems has been to devise a technique which will permit the equitable competition of three camera concepts designed against varied technical and operational requirements, and all of which are at different stages of analysis, design, and demonstration of critical technology. Both CIA and SAFSP prepared and submitted proposed RFP's for the camera sub-system. Neither one was completely acceptable for the same general reasons--both were understandably oriented toward the technical and management concepts of the authoring organizations and would not, in my opinion, have insured an equitable competition.

Accordingly, I and a few members of the NRO Staff prepared a new [illegible] RFP which combined the best features of the proposed RFP's, established a minimum of required criteria, introduced [illegible] factors (film load requirements, target lighting characterisitics, etc) based on actual CORONA and GAMBIT experience, developed a technique for computing mission-effectiveness values (which rewards desirable design characteristics, as appropriate, in a system but does not unduly penalize those in which this feature was not an initial design objective), etc.

SAFSP had no comments of any significance with regard to the RFP and generally accepted it.

The RFP was reviewed in depth with Dr. Land's PSAC panel. The panel generally agreed with the RFP with the addition of a few minor modifications and clarifications. One or two panel members expressed the opinion that we had not rewarded high resolution (3' or better) enough in comparison to low resolution (8' or worse) in the mission value computations; however, no one felt strongly enough to propose a rationale on which to base a different set of values for this arbitrary judgment. All in all, I feel the Panel accepted the RFP as a reasonable approach to an equitable competition of the camera designs.

The Panel inquired as to the desirability of competing the EK design (now being carried by Itek) in addition to the Perkin-Elmer and Itek designs (the Panel strongly favors the Itek or P-E designs over the EK concept). I advised the Panel that proposal of the EK design would be left strictly up to Itek--if Itek believed in the EK design and felt that the submittal of both designs would provide two distinctly attractive alternatives which might increase their prospects of meeting the requirements and would not dilute their effort on the Itek-proprietary design, then they should bid both. On the other hand, if Itek chose not to bid the EK design, we would not urge them to do so.

The CIA has not commented officially on the RFP, but has made comments and counter proposals with respect to the management plan and assignments of system responsibility. The point may be raised that since the CIA will be responsible for the sensor, they should prepare the RFP and specify in details all tasks, etc. In response, I would point out that the RFP previously proposed by CIA was too specifically oriented (and understandably so) toward the P-E concept and that the Agreement specifies that their responsibility will begin after source selection. Finally, the RFP in its broad outline preserves the maximum option for the CIA to specify the details of sensor subsystem tasks within the overall framework of a system objectives and design. We agree that details of the RFP will be subject to final revision by the Source Selection Board. In any event, the RFP will result in initial sensor specifications, interface definitions, etc, and a work statement which will be reviewed by the CIA and SAFSP prior to final negotiation.

In summary, I do not expect the camera RFP to be a major issue at the ExCom meeting.

MANAGEMENT PLAN:

Management and assignment of system responsibilities, however, are expected to be major issues at the ExCom meeting. In brief, CIA has proposed and will propose to the ExCom that they be responsible for more than the sensor on the basis that this arrangement will simplify interface problems. CIA could follow this with the proposal that CIA should provide the System Project Director (SPD) on the grounds that they would then be responsible for the major elements of the on-orbit vehicle.

Briefly, the management plan I have proposed to the ExCom follows the 1965 NRP Agreement--namely that CIA will be responsible for camera development and production, and SAFSP will be responsible for other system elements (booster, spacecraft, RV's, launch facilities, on-orbit command and control facilities, etc). Additionally, for purposes of overall system engineering and integration, master planning, mission control, etc, SAFSP will be designated as the System Project Director (with clearly defined constraints on SPD authority, however, in view of the assigned CIA responsibilities).

SAFSP comments on the proposed management plan generally were concerned with communications between SAFSP and CIA during the development phase. General Martin doubts that the two project offices located 2,000 miles apart (SAFSP in Los Angeles, and CIA at Langley) can operate even reasonably effectively. He made a strong plea to co-locate the two project offices in Los Angeles. I agree with Gen Martin that the wide physical separation will make the communications problem more difficult, but not at all impossible if both SAFSP and CIA make a sincere effort to work together.

Gen Martin also feels that his ability to do a really satisfactory job of system engineering will be severely limited because he is enjoined from directing in detail the internal design of the sensor, and for this reason is restrained in some respects from arriving at optimum solutions to overall system problems. Again I feel that a satisfactory solution of this problem is possible providing that the proposed management arrangements are implemented in an atmosphere of free communication and full cooperation.

I had a lengthy discussion on management with Dr. Garwin at my meeting with the PSAC Panel (he was the only panel member who had comments of any significance in this area). Since Dr. Garwin's comments and questions were exactly the same as those raised by CIA, I am unable to determine whether he was stating his own convictions or merely pressing CIA concepts to test their validity. In any event, I do not believe that the Panel will advise Dr. Hornig to take a strong stand of any kind on the proposed management arrangements.

Mr. Sheldon delivered CIA comments on the management arrangements to me and discussed other aspects of the report. He expressed concern that the proposed management plan directive did not contain some of the management rationale explanations and the more definitive expositions of CIA responsibilities and authorities set forth elsewhere. As a result of this discussion, the proposed management directive has been rewritten to cover most of the questions he raised.

Mr. Sheldon's major concern, however, (and as I now understand it, the position which will be taken by CIA at the ExCom meeting), was that the proposed assignment of responsibility for only the sensor to CIA would cause an interface problem of great magnitude. CIA feels it would cause continual negotiation between SAFSP and CIA on matters ranging from minute details to those of basic importance, that the sensor probably would be subordinated to other requirements of the overall system, that the effective working relationship between CIA and the contractors would be jeopardized, etc.

The proposed CIA solution to the problem is to divide the on-orbit vehicle into modules. In this plan, all spacecraft components (stabilization, power, command and control, auxiliary propulsion, etc) would be packaged into a single module next to the booster, with SAFSP responsible for this module while the CIA would be responsible for everything forward of that point (cameras, structure, integration of RV's, etc, ala CORONA). This is in effect a matter of defining the spacecraft to be that part of the on-orbit vehicle aft of the cameras. This position is a modification of an earlier CIA position which held that total responsibility for the re-entry vehicles was also necessarily a part of the sensor module responsibility, because the film path terminated in the RV's.

I believe that the CIA argument for a responsibility broader than the sensor subsystem will be at least partially based on the recommendations of the Technical and Management Task Groups (comprising representatives from the CIA, SAFSP and the NRO Staff) which I set up to review the problems of the new general search system. The Management Task Group actually recommended the modular approach but without really resolving the problem of how system engineering responsibilities might be divided. This is understandable in the light of the desire of the Group to achieve a common denominator of agreement. However, their recommendations really left the resolution of the key management question open--namely, how to manage the integration and interface problems of the so-called Sensor Module. The Management Task Group statements which illuminate this dilemma are as follows:

1. "Matters of camera subsystem alignment, mounting in the Sensor Module structure, thermal control etc are of such significance that CIA-OSP should be responsible for not less than the entire Sensor Module."

2. "The Task Group is concerned in either the single SPD or Co-SPD management arrangement and with any of the optional arrangements of responsibilities with overall system integrity--from a structural, system engineering, interface, etc, viewpoint.

It is believed that very close attention must be paid to overall system integrity. The Task Group concluded that the contractor who wins the OCV (Orbital Control Vehicle) competition should also (1) design and build the Sensor Module structure (as a sub or associate contractor to the Sensor contractor); (2) design and build the RV Module (sans RV) and (3) be the overall system integrating contractor."

Apparently, these assignments of tasks (and particularly the last task (3)) to the OCV contractor were intended to be the means of bridging the gap between the responsibilities of two independent government agencies. I do not consider this to be a satisfactory way for the government to conduct its business. It could easily lead to the kind of paralysis of government processes which has beset the CORONA Program for these past two years.

I also do not agree with the CIA-proposed solution for several technical reasons which really, for the most part, are encompassed in the integration problems forseen but not really resolved by the Management Task Group. These lie in the areas of overall system integrity, efficiency of design, flexibility in the location of components, etc. Most of these points are set forth in the management attachments (Atchs 3 and 4-5) to my memo to the ExCom. You may wish to read these two documents prior to the meeting; for your convenience, copies are attached hereto.

The CIA feels that communications with SAFSP can be kept to an absolute minimum by the modular approach. Further, as indicated in the CORONA discussions over the past two years, CIA may not wish to be subordinated to SAFSP for any system matters. Personally, I do not believe we can develop an effective system at all unless there are free and frequent communications and a close rapport between CIA and SAFSP--no matter what assignments of management responsibility are made. Some pertinent considerations on the management questions follow:

1. No satellite reconnaissance or other system of comparable complexity, so far has been developed (and this includes CORONA) without integrated system design and testing.

2. The question of who has the resources or competence has not, in itself, been controlling in the past (OXCART, for example, wherein the bulk of the technical and operational manpower is provided by the Air Force). Operational control has been overriding, and while this may be a CIA objective for the new search system, the resources required for on-orbit operations are under the control of SAFSP.

3. Management plans designed to avoid close relationships are simply not realistic. Unless we can have close relationships between agencies, no management scheme will work. Further, however close the relationship, responsibilities and authorities must still be clearly defined.

4. The number of segregated or isolated pieces of the hardware to be treated as invariants in overall system design should be kept to an absolute minimum. An arbiyrary partitioning of the spacecraft, when there are no technical reasons to do so, inhibits the spacecraft designer from consideration of all reasonable approaches and from achievement of the best design.

5. The system element breakdown among contractors (i.e, a sensor contractor, anohher for the spacecraft, etc) has proved reasonable and workable in many DOD projects and is in fact the approach assumed by CIA. The discussion with CIA really only pertains to the roles and relationships of Government agencies.

The present CORONA situation may be brought up as an example of how the new system should be managed. I do not feel this is sound rationale when the CORONA is considered in its proper context. History indicates that the CIA role in CORONA from 1958 through late 1963 was confined almost exclusively to top-level general support, contracting services, and security practices which were, in fact, significant contributions. However, the Air Force did actually provide the System Project Director and virtually all technical direction throughout that period. Subsequently, the CIA moved its contracting officers away from Los Angeles and, by virtue of holding the contracts, began to exercise an ever-increasing technical management as the technical competence of the CIA in this field was increased by staff additions. However, this has been largely a production and minor modification management task rather than one of development.

6. The importance of having unified and authoritative control of a mission vehicle on orbit mandated the use of a project director and, because of present and contemplated future on-orbit control arrangements, dictated assignment of this responsibility to SAFSP.

7. As the system design and fabrication plan evolved, minor changes in assigned responsibilities might be in order to achieve the best fabrication or test sequence. It would be the responsibility of the Program Director to make determinations of such matters without regard to organizational barriers. Because of the direct straight-line and management relationships between the DNRO and SAFSP, it would as a matter of fact be much simpler to direct and implement the transfer of responsibility to the CIA for specific sub-tasks than to accomplish a reverse transfer.

Adm Raborn listened attentively to this exposition of my position and reasserted his desire to have a workable management approach with full cooperation and communication between CIA and SAFSP, but he did not, at any time indicate his acceptance of any of the particular points I made, nor did I expect that he would since obviously some of his people hold strong views on many of the matters discussed.

IN SUMMARY:

1. The assignment of responsibility for the development of the sensor subsystem to the CIA and overall system management (including operations) to SAFSP is in accordance with the NRP Agreement, is the clearest managerial arrangement, represents the best division of responsibilities from a technical view point, simplifies the assignment of technical responsibilities, and yields the greatest flexibility in assuring an optimum design of the overall system.

2. The division of responsibility recommended by the CIA appears at first glance to be simple; however, it creates a number of what I consider to be very difficult system integrity problems (structural, electrical, thermal, and electromagnetic interfaces) and inhibits flexibility in the spacecraft design.

3. While either arrangement might be made to work, providing communications between the two agencies remain viable and effective, I believe my proposed arrangement is far superior in ease of management and in clarity of the description of technical interfaces.

Signed

Alexander H. Flax
Director
National Reconnaissance Office

Attachments